INFLUENTIAL FACTORS IN DETERMINATION OF BIOMASS THERMAL SUSCEPTIBILITY BY THERMAL ANALYSIS

L. Montenegro Mateos[1]; E. Querol Aragón[1]; L. Medic Pejic[1]; J. García Torrent*[1,2]

[1] Departamento de Ingeniería Química y Combustibles, Universidad Politécnica de Madrid, C/ Alenza 4, 28003 Madrid, Spain.
[2] Laboratorio Oficial J.M. Madariaga, C/ Eric Kandel, 1 - (TECNOGETAFE). Parque Científico y Tecnológico de la UPM. 28906 Getafe (Madrid)
* Autor que presenta la comunicación: Javier.garciat@upm.es Tel. +34 913 366 991 Fax: +34 913 366 984

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Biomass stored in silos are potentially able to absorb oxygen to produce exothermic oxidation reactions. If the generated heat in these reactions is not properly dispersed, causes a self-heating of the organic matter that can cause breakdown and ignition. In the field of possible self-combustion in the storage and handling of the biomass there are several factors which have influence in biomass thermal susceptibility, i.e. its tendency to oxidation and subsequent ignition of the substance. In this respect, the different biomass analysis to determine their behavior is shown here.

This study has been developed using biomass obtained from agriculture, forestry and waste with different chemical composition. Samples have been prepared by different physical processes to assess the influence of different factors in their self-combustion.

Different biomass were studied: pine shaving, black poplar wood chip, wheat straw, brassica, aromatic plant waste, olive oil waste, grape seed meal, olive pit and three types of almond shell, varying in the latter sample its origin. All products tested are commercial products available in the market for potential use in gasification plants.

Methods employed were based on classical techniques of thermogravimetry, differential scanning calorimetry, analysis of composition and morphology analysis. Methodologies used in the thermal analysis are not standard tests. In order to compare results, test widely used in previous research works has been carried out to define the characteristic parameters of the experimental methodology.

In conclusion, thresholds and values has been shown to link biomass physical properties studied in its self-combustion, analyzing the influence of the preparation processes of biomass on the variables that characterize its thermal susceptibility.